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SAW Components

SAW Duplexer

Cellular / WCDMA Band V

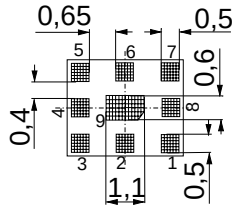
Series/type:	**B7683**
Ordering code:	**B39881B7683L310**
Date:	October 13, 2009
Version:	2.3

Application

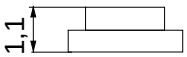
- Low-loss SAW duplexer for mobile telephone WCDMA Band V systems
- Low insertion attenuation
- Low amplitude ripple
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path

Features

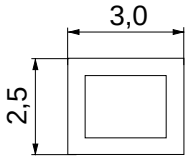
- Package size 3.0 x 2.5 x 1.1 mm^3
- RoHS compatible
- Approx. weight 0.035 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- Fully matched by integrated matching network
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



bottom view



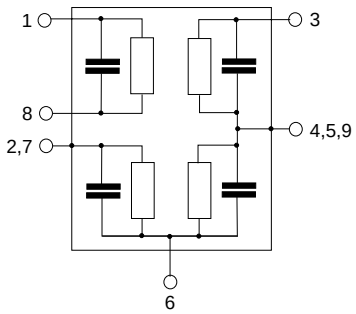
side view



top view

Pin configuration

■	3	TX Input
■	1, 8	RX Output (balanced)
■	6	Antenna
■	2, 4, 5, 7, 9	To be grounded



Characteristics

Temperature range for specification: T = –15 ˚C to +80 ˚C
Antenna terminating impedance: Z_{ANT} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - ANT		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C		836.5		MHz
Maximum insertion attenuation					
@$f_{Carrier}$ 826.4 ... 846.6 MHz	α_{WCDMA} [1]		1.4	1.8	dB
Amplitude ripple (p-p)					
@$f_{Carrier}$ 826.4 ... 846.6 MHz	$\Delta\alpha_{WCDMA}$		0.2	1.0	dB
Error Vector Magnitude					
@$f_{Carrier}$ 826.4 ... 846.6 MHz	EVM [2]		1.1	2.5	%
Input VSWR (TX port)					
824.0 ... 849.0 MHz			1.5	1.9	
Output VSWR (ANT port)					
824.0 ... 849.0 MHz			1.5	1.8	

[1] Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (7).
[2] Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Characteristics

Temperature range for specification: T = –15 ˚C to +80 ˚C
Antenna terminating impedance: Z_{ANT} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - ANT					min.	typ. @ 25 ˚C	max.	
Attenuation				α				
0.3	...	779.0	MHz		30	35		dB
779.0	...	804.0	MHz		30	40		dB
@$f_{Carrier}$ 871.4	...	891.6	MHz	α_{WCDMA} [1)]	45	48		dB
1550.0	...	1600.0	MHz		35	48		dB
1648.0	...	1698.0	MHz		30	54		dB
2400.0	...	2547.0	MHz		25	33		dB
2547.0	...	4120.0	MHz		10	18		dB
4120.0	...	4245.0	MHz		15	25		dB
4245.0	...	5150.0	MHz		10	13		dB
5150.0	...	5825.0	MHz		8	11		dB

[1)] Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (7).

Characteristics

Temperature range for specification: T = –15 ˚C to +80 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs ANT - RX		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C		881.5		MHz
Maximum insertion attenuation					
869.0 ... 894.0 MHz	α_{max}		1.9	2.7[1]	dB
@$f_{Carrier}$ 871.4 ... 891.6 MHz	α_{WCDMA}[2]		1.8	2.5	dB
Amplitude ripple (p-p)					
869.0 ... 894.0 MHz	$\Delta\alpha$		0.6	1.3	dB
@$f_{Carrier}$ 871.4 ... 891.6 MHz	$\Delta\alpha_{WCDMA}$		0.5	1.0	dB
Common mode rejection ratio CMRR					
869.0 ... 894.0 MHz		23	28		dB
Error Vector Magnitude					
@$f_{Carrier}$ 871.4 ... 891.6 MHz	EVM[3]		1.7	2.5	%
Input VSWR (ANT port)					
869.0 ... 894.0 MHz			1.5	1.8	
Output VSWR (RX port)					
869.0 ... 894.0 MHz			1.8	2.0	

1) 3.0 dB for T = -25 ... -15 ˚C and T = +80 ... +85 ˚C.
2) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (7).
3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Characteristics

Temperature range for specification: T = –15 ˚C to +80 ˚C
Antenna terminating impedance: Z_{ANT} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs ANT - RX					min.	typ. @ 25 ˚C	max.	
IMD product level limits[1)]								
at f_{TX} = 836.5 MHz f_{RX} = 881.5 MHz								
Blocker 1		45.0	MHz			-105	-101	dBm
Blocker 2		791.5	MHz			-121	-110	dBm
Blocker 3		1718.0	MHz			-120	-110	dBm
Attenuation				α				
0.3	...	779.0	MHz		40	56		dB
779.0	...	824.0	MHz		40	58		dB
@$f_{Carrier}$ 826.4	...	846.6	MHz	α_{WCDMA}[2)]	47	53		dB
849.0	...	854.0	MHz		23	50		dB
914.0	...	1693.0	MHz		23	37		dB
1693.0	...	1788.0	MHz		45	63		dB
1788.0	...	2400.0	MHz		40	55		dB
2400.0	...	2500.0	MHz		40	49		dB
2500.0	...	2682.0	MHz		40	45		dB
2682.0	...	5000.0	MHz		30	45		dB
5150.0	...	5825.0	MHz		30	37		dB
5825.0	...	6000.0	MHz		30	34		dB

1) Power levels: 21dBm Tx signal, -15dBm blocker at antenna port.
2) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (7).

Characterisitcs TX - RX					min.	typ. @ 25 ˚C	max.	
Isolation				α				
@$f_{Carrier}$ 826.4	...	846.6	MHz	α_{WCDMA}[1)]	50	57		dB
@$f_{Carrier}$ 871.4	...	891.6	MHz	α_{WCDMA}	45	49		dB

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (7).

Maximum ratings

Temperature range for specification[1)]	T	–15/+80	˚C	
Operable temperature range[2)]	T	–25/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100	V	machine model, 1 pulse[3)]
	V_{ESD}	Tx: 150	V	human body model, 1 pulse[4)]
	V_{ESD}	Ant: 300	V	human body model, 1 pulse[4)]
	V_{ESD}	Rx: 150	V	human body model, 1 pulse[4)]
	V_{ESD}	500	V	field -induced charged device model[5)]
Input power at	P_{IN}			source and load impedance 50 Ω
824.0 ... 849.0 MHz		30	dBm	} continuous wave T = 55˚C, 50.000 h
elsewhere		10	dBm	

1) Defines the temperature range in which the specification values are warranted.

2) Defines the temperature range in which the SAW device keeps its typical characteristics, however the specification values are not guaranteed.

3) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

4) acc. to JESD22-A114B (human body model), 1 negative & 1 positive pulse.

5) acc. to JESD22-C101C (field-induced charged device model).

Annotation for characteristics section

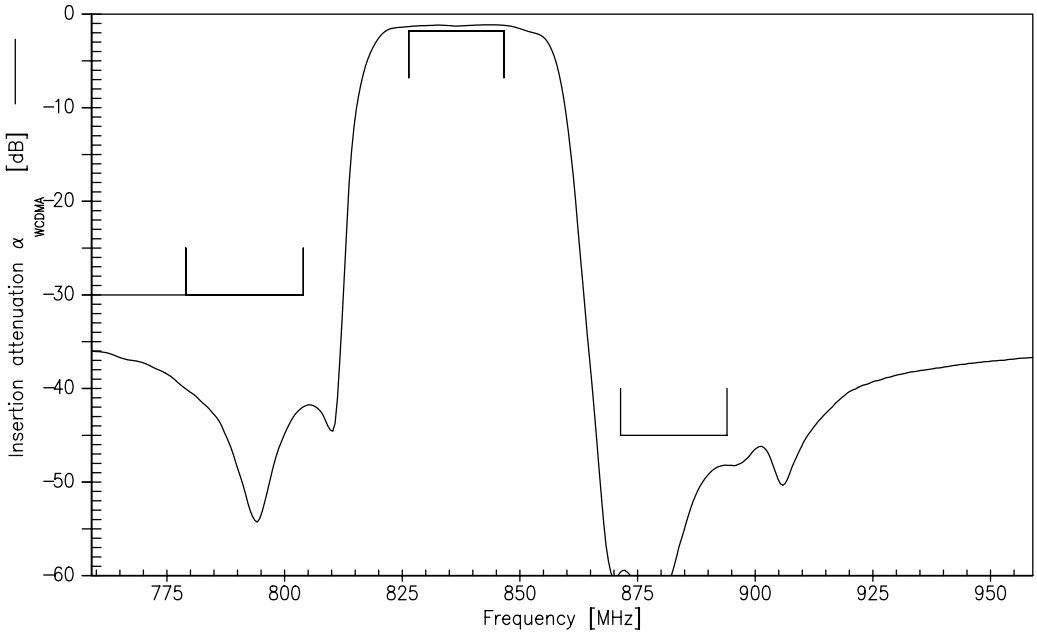
Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

$$\int_{\infty}^{\infty} |S_{ds21}(f) H_{RRC}(f - f_{Carrier})|^2 df$$

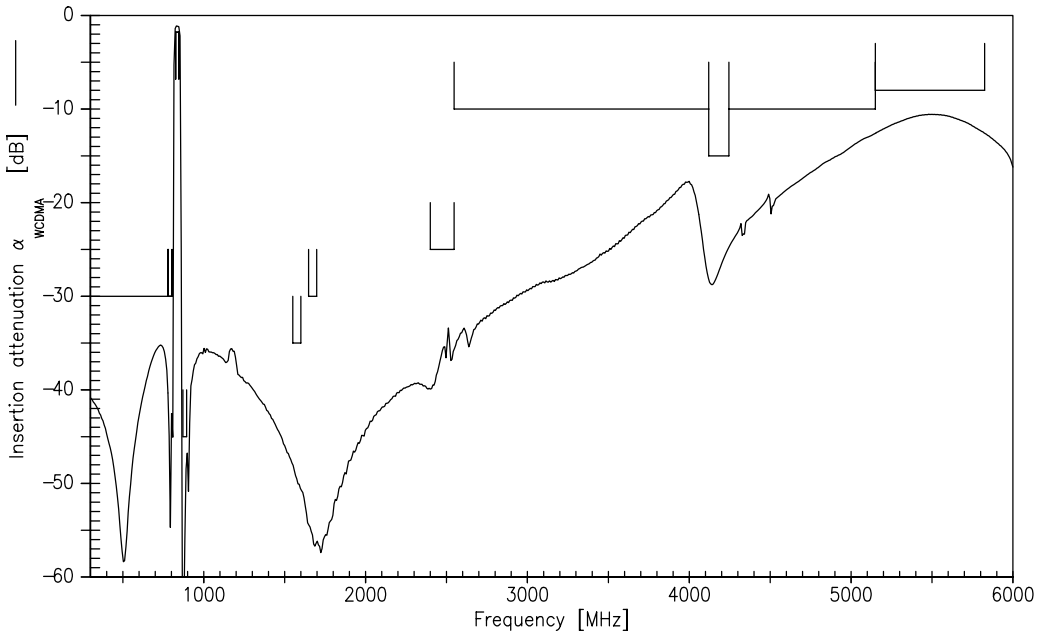
$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for WCDMA Band 5-Passband, $f_{Carrier}$ ranges from 826.4 MHz (lowest Tx channel) to 846.6 MHz (highest Tx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

$$\int_{\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$

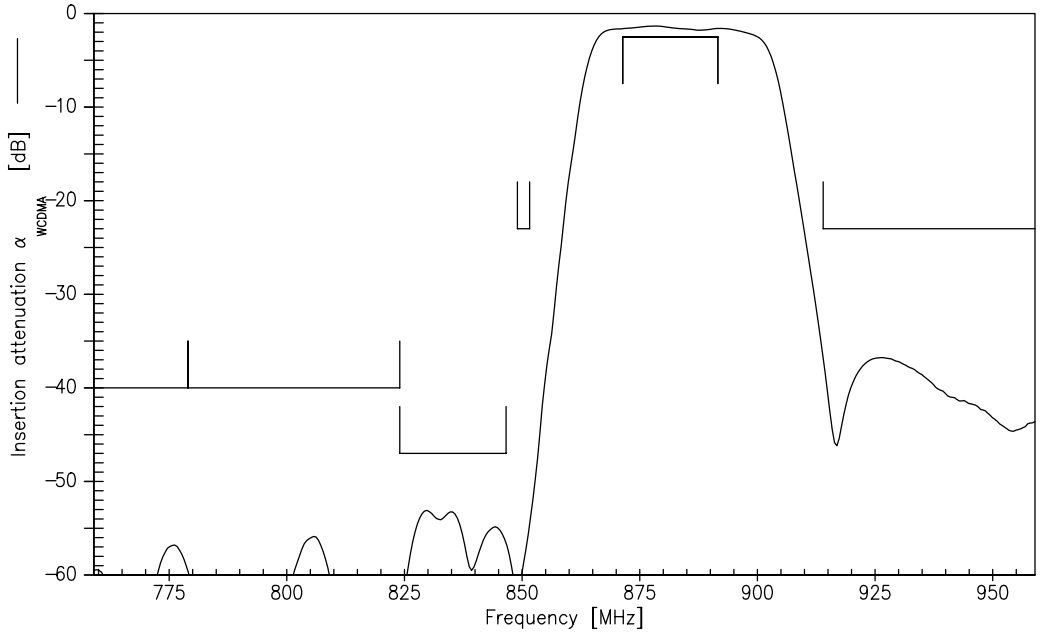
Frequency Response TX-ANT



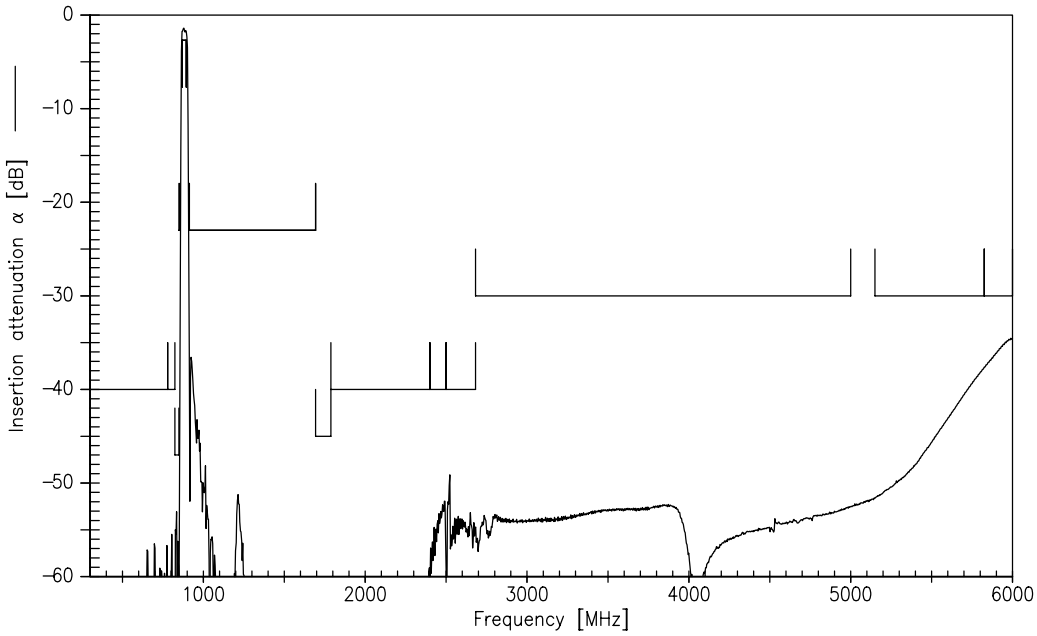
Frequency Response TX-ANT (wideband)



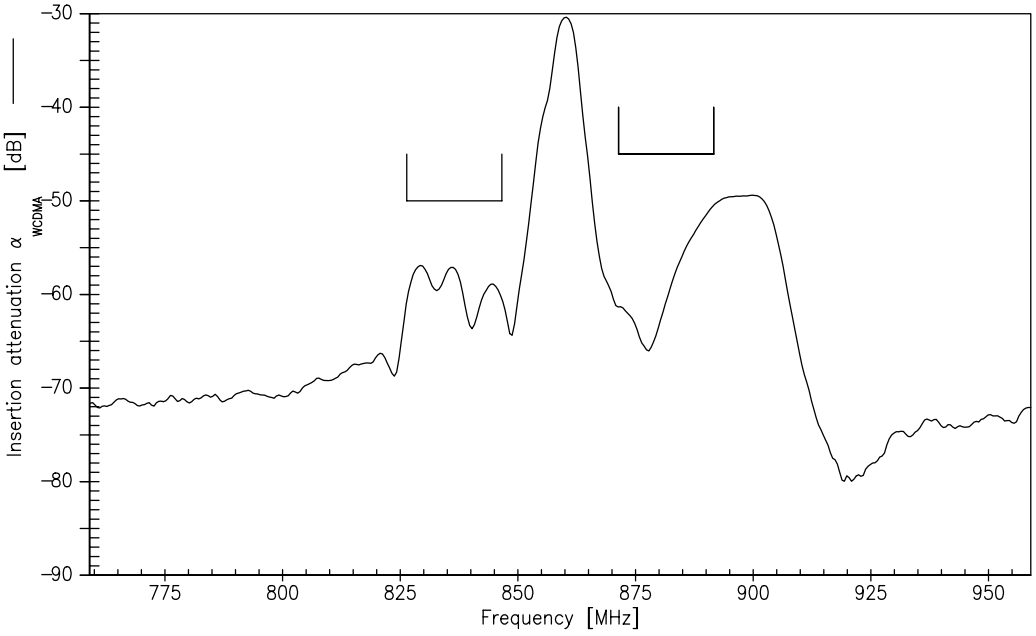
Frequency Response RX-ANT



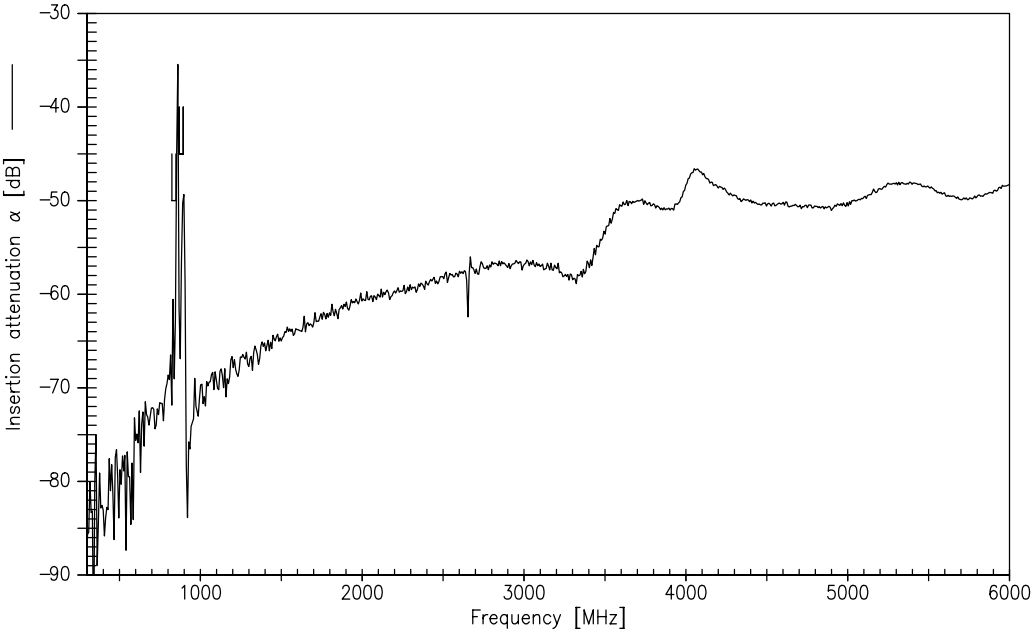
Frequency Response RX-ANT (wideband)



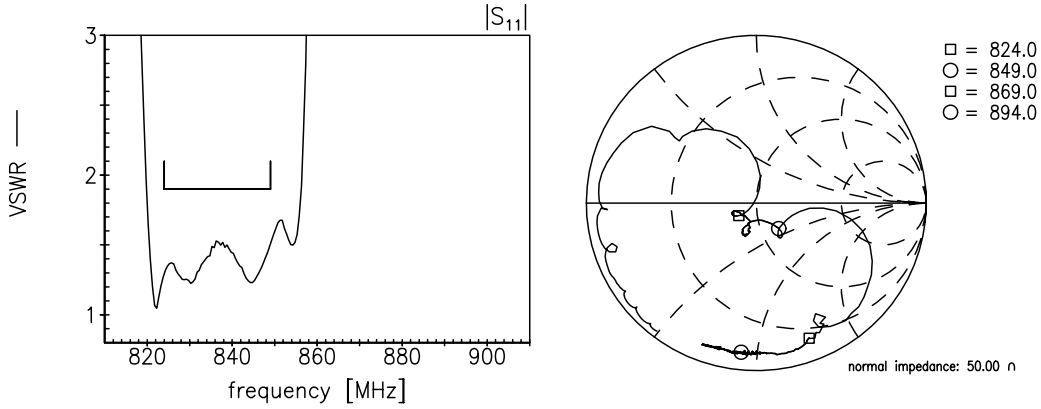
Frequency Response TX-RX

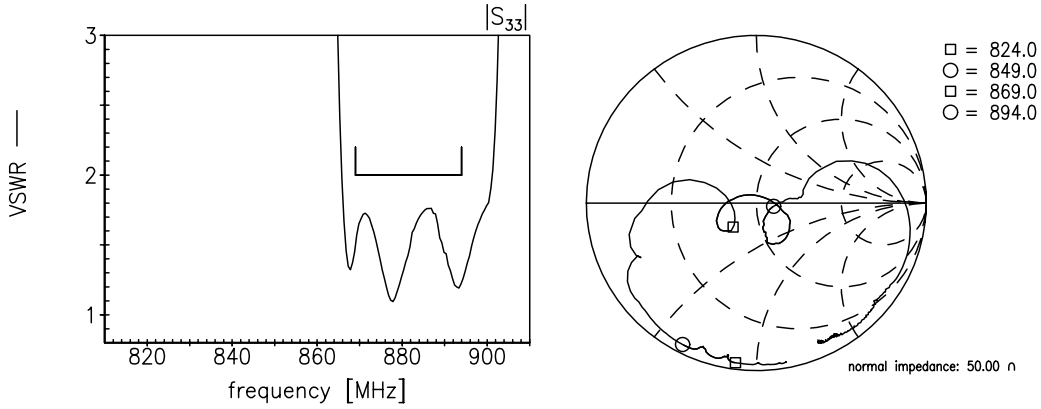


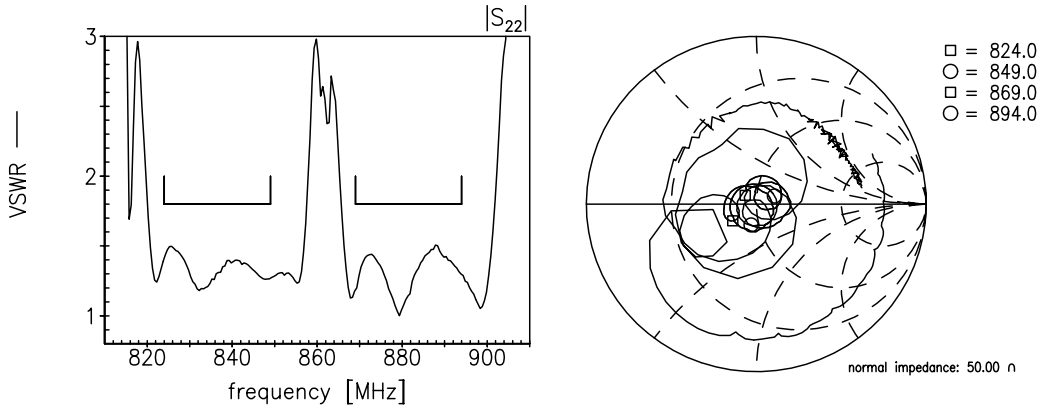
Frequency Response TX-RX (wideband)



Return Loss **S_{11} TX- port** **S_{22} ANT-port** **S_{33} RX-port**







References

Type	B7683
Ordering code	B39881B7683L310
Marking and package	C61157-A3-A56
Packaging	F61074-V8211-Z000
Date codes	L_1126
S-parameters	B7683_NB.s4p B7683_WB.s4p
Soldering profile	S_6001
RoHS compatible	defined as compatible with the following documents: "DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment."

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